IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

**PATENT APPLICATION**

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| In re Application of: | : | Group Art Unit: **2502** |
| **J. VAN DER HOOFDEN, et al.** | : | |
| | : | |
| Entitled: | : | Examiner: **M. Shingleton** |
| **CIRCUIT ARRANGEMENT IN WHICH THE INPUT AND OUTPUT VOLTAGE OF A DC TO DC CONVERTER ARE ADDED TOGETHER TO OPERATE A DISCHARGE LAMP** | : | Docket No: **PHN 15-364A** |
| | : | |
| Serial No.: **08/675,665** | : | Mahopac, NY 10541 |
| | : | |
| Filed: **July 3, 1996** | : | Date: **July 21, 1999** |

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

APPEAL BRIEF FILED UNDER 37 C.F.R. § 1.192

This Appeal Brief is being filed in response to the Examiner's Final Rejection of Claims 1, 2 and 4-7, which are all of the claims still pending in this application. A Notice of Appeal was filed on May 21, 1999.

**Real Party in Interest**

The real party in interest in this application is U.S. Philips Corporation of 580 White Plains Road, Tarrytown, NY. 10591.

**Related Appeals and Interferences**

There are no related appeals or interferences.

**Status of Claims**

Claims 1, 2 and 4-7 are pending. No claims have been allowed, but Claim 7 is considered allowable if rewritten in independent form. Claims 1, 2 and 4-7 were finally rejected in an Office Action dated February 17, 1999 and are the claims under appeal. Claims 1, 2 and 4-7 are set forth in Appendix A in accordance with 37 C.F.R. § 1.192(c)(7).

**Status of Amendments**

An amendment has been filed under Rule 116 and action on this amendment is pending. All other amendments have been entered.

**Summary of the Invention**

The invention relates to circuit arrangements for igniting and operating high-pressure discharge lamps and

particularly to such arrangements in which a DC to DC converter is used to generate a comparatively high amplitude DC voltage for operating the lamp. A relatively low amplitude first DC voltage is converted by a switching element to an alternating voltage which in turn is converted by a transformer to a relatively high amplitude alternating voltage. The relatively high amplitude alternating voltage is then rectified to form a relatively high amplitude second DC voltage for driving the high-pressure discharge lamp. As a result, a discharge lamp requiring a relatively high burning voltage can be supplied from a DC source of relatively low amplitude.

Typically, the outputted DC voltage is converted once again to an AC voltage and the resulting relatively high AC voltage actually drives the high-pressure discharge lamp. The frequency of the first conversion to AC is selected to be compatible with the transformer, while the frequency of the second conversion to AC is selected to be compatible with the high-pressure discharge lamp.

A disadvantage is that considerable power is dissipated in the circuit components, especially the transformer, particularly during ignition and run up of the high-pressure discharge lamp to stable operation. The invention aims to lower the power dissipation in the

circuit components, particularly during the ignition and run up phase.

This is accomplished by connecting the output winding of the transformer in series with the DC input terminals so that the output DC voltage supplied to the lamp operating circuitry is equal to the sum of the first DC voltage (the inputted relatively low amplitude DC voltage) and the second DC voltage (the rectified relatively high amplitude DC voltage). As a result, some of the power that is being supplied to the lamp operating circuitry (called the second circuit in the claims) does not pass through the transformer (the portion equal to the product of the first DC voltage and the lamp current).

After ignition, the voltage across a high-pressure discharge lamp is relatively low and increases gradually during run up to an operating voltage that is relatively high. During run up, therefore, the first DC voltage is a relatively significant part of the voltage across the discharge lamp. The portion of the power received by the discharge lamp directly from the DC input source without passing through the transformer thus is particularly significant during the run up phase. This allow for a higher lamp current during run up without damaging circuit components, which in turn shortens the time duration of the

run up phase. A shorter run up phase is generally desirable.

## Issues

A first issue for appeal is whether Claims 1, 2 and 4-7 have been properly rejected under 35 U.S.C. §112 as being indefinite because "said secondary circuit through" added to Claim 1 in the amendment mailed November 19, 1998, is said to lack antecedent basis. The pending Rule 116 amendment hopefully addresses this issue and renders this issue moot.

The second issue for appeal is whether Claims 1, 2 and 4-7 have been properly rejected under 35 U.S.C. §103 as being unpatentable over STEVENS (U.S. Patent 4,277,728) in view of TAP (U.S. Patent 3,079,525). The pending Rule 116 amendment hopefully makes this issue moot with respect to Claims 2 and 4-7.

## Grouping of Claims

Claim 7 and all claims depending therefrom (if any, depending upon entry of the pending Rule 116 amendment) form one grouping of claims, which group is apparently considered allowable (subject only to the 35 U.S.C. §112 rejection).

Claim 1 and all claims depending therefrom (if any, depending upon entry of the pending Rule 116 amendment) form a second grouping of claims.

**Argument**

The 35 U.S.C. §112 rejection is believed to be addressed by the pending Rule 116 amendment. In any event, the phrase "said secondary circuit through" found in lines 27-28 and added to Claim 1 in the amendment mailed November 19, 1998 finds antecedent support in line 23 of Claim 1.

Claims 1, 2 and 4-7 have been rejected under 35 U.S.C. §103 as being unpatentable over STEVENS in view of TAP.

It is the position of Appellant that it is not obvious to combine TAP and STEVENS. This is believed to be true because the combination will not function successfully during ignition of a discharge lamp. A discharge lamp is recited in the preamble of Claim 1 and is referred to in the body of Claim 1.

STEVENS has been cited as disclosing the basic arrangement being claimed, namely the "DC to DC converter that 'generates' a second DC voltage from the first DC voltage", a switching element in this DC-DC converter and a control circuit that controls the switching element at high frequency. The switching regulator 16 apparently is being identified as the claimed "DC to DC converter". The

claimed second circuit apparently is identified as the inverter 20 that powers the lamp 11.

It is recognized by the Examiner that STEVENS does not describe the claimed specific arrangement of the DC source. However, it is not clear whether (1) the Examiner is identifying the DC source 70 in STEVENS as the claimed "voltage source for supplying the first circuit with the first DC voltage" while recognizing that DC source 70 is not specifically arranged as claimed, or whether (2) the Examiner is identifying bridge rectifier 13 as being the claimed voltage source for supplying the first circuit with the first DC voltage while recognizing that the bridge rectifier 13 is not specifically arranged as claimed.

Both alternatives are deficient. The DC source 70 is not connected to supply a voltage to the switching regulator 16 at all (actually it serves to substitute for the switching regulator 16 during a power failure, see col. 8, lines 52-56), so DC source 70 clearly cannot serve as the voltage source for supplying the first circuit (the regulator 16) with a first DC voltage!

Bridge rectifier 13 does supply voltage to the switching regulator 16, but bridge rectifier 13 does not supply a DC voltage! This is clear from col. 4, lines 45-49. Furthermore, STEVENS teaches away from filtering the output of the bridge rectifier 13 to produce a DC voltage

(see col. 3, 27-31). Thus, STEVENS fails to teach the claimed input terminals for connection to "a voltage source for supplying the first circuit with the first DC voltage".

More fundamentally, since the regulator 16 of STEVENS is not supplied with DC voltage, the regulator 16 of STEVENS does not qualify even as a DC to DC converter (i.e., regulator 16 does not generate a second DC voltage from a first DC voltage as claimed).

TAP is cited as disclosing a specific arrangement of a DC source and a DC to DC converter such that the voltage of the DC source and the output voltage of the DC to DC converter are added together to supply a load. While there are many differences between TAP's circuits and the subject circuit, TAP does appear to teach a circuit in which the DC source and the output voltage of a DC to DC converter are added together to supply a load.

The Examiner states that "the great advantage to adding the first DC source to the second involves the protection of such a circuit during a no load condition." The Examiner may believe this, but TAP did not say so or infer so anywhere that can be uncovered. At col. 1, lines 39-44, TAP explains why the output direct current circuit contains the direct voltage supply source. This is done to promote the starting of the oscillator! The oscillator in

TAP needs to be started because the TAP DC-DC converter is a self-oscillating circuit that needs to be started.

The switching element T1 in the subject invention is not self-oscillating. The control circuit SC1 that renders the switching element T1 conducting and non-conducting in the subject invention **forces** the alternative states to occur and does not receive an input from the load as in TAP. Oscillation of the switching element T1 is driven or forced by a separate control circuit SC1 and does not occur otherwise. The subject circuit thus does not suffer from any self-oscillation starting problems and does not require any measures intended to promote the starting of self-oscillation as in TAP.

TAP fails to teach or suggest any other reason or motivation for making the output direct current circuit contain the direct voltage supply source. Accordingly, there is no teaching of a motivation or incentive to add this feature to any circuit where the starting of a self-oscillation does not need to be helped.

It is true that TAP aims to protect the circuit under a no load condition, but this is accomplished by removing drive current from the bases of transistors 1,2 (or transistor 4 in the second and third embodiments) under a no load condition, which stops the self-oscillation (see col. 2, lines 59-62). In all embodiments, the base drive

current cannot exceed the load current and under a no load condition, the load current is zero.

While TAP does observe that the DC source voltage contributes to the output voltage, no connection is made or is apparent between this fact and the aim of protecting the circuit under a no load condition. The purpose in having the DC source voltage contribute to the output voltage apparently has nothing to do with control of the base current to transistors 1,2,4 during a no load condition! Perhaps the Examiner can explain how the adding of the DC source voltage to the output of the DC to DC converter protects the circuit during a no load condition.

The Examiner argues that no load conditions are common with lamp circuits and that by "unloading the inverter the DC source also becomes un-loaded presenting a dangerous condition to the converter". Apparently the Examiner is arguing that it is obvious to add the circuit protection taught by TAP to the circuit of STEVENS.

The Examiner is correct that a no load condition is common with lamp circuits. In fact, STEVENS describes that it occurs with an HID lamp during the start-up mode (see col. 7, lines 14-16). What is particularly significant is that the STEVENS circuit is already designed to handle an open circuit load! Not only is the STEVENS circuit designed to handle an open circuit load, but it is designed

to generate a very high output voltage under such conditions, which is exactly what is required to get an HID lamp ignited (see col. 7, lines 16-41)! What the Examiner is suggesting as obvious (adding the no load circuit protection taught by TAP, namely means for causing the base drive current to go to zero under a no load condition) will actually make the STEVENS circuit inoperative to ignite the HID lamp! The STEVENS circuit apparently can handle without danger not only an open circuit output condition (whether this occurs as a result of removal of a lamp or merely the start-up of an HID lamp) but also can handle a short circuit load condition without danger (see col. 7, lines 42-63). There is no apparent incentive to add circuit protection for a no load condition to STEVENS because the STEVENS circuit is already fully protected from all load current extremes.

While TAP apparently describes a circuit that incidently adds the DC voltage input to a DC to DC converter to the output DC voltage of the converter, there is no disclosure or suggestion that the described circuit arrangement will reduce power loss when used to operate a discharge lamp. Accordingly, there is no teaching of an incentive to modify a circuit arrangement for operating a discharge lamp (such circuit arrangements inherently not requiring any protection from a no-load condition).

## CONCLUSIONS

The rejection of Claims 1, 2 and 4-7 under 35 U.S.C. §103 as being unpatentable over STEVENS in view of TAP is thus believed to be improper and should be reversed, which is respectfully urged. In the event the Rule 116 amendment has not made the 35 U.S.C. §112 issue moot, the 35 U.S.C. §112 rejection is believed to be improper as well because the identified phrase added in the amendment mailed November 19, 1998 does find antecedent support earlier in Claim 1.

Respectfully submitted,

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## APPENDIX A

1. A circuit arrangement for operating a discharge lamp, the circuit arrangement having reduced power loss, comprising:

a first circuit for generating a second DC voltage from a first DC voltage, including

input terminals for connection to a voltage source having a cathode and an anode for supplying the first circuit with the first DC voltage,

a switching element,

a control circuit coupled to the switching element for changing the conductive state of the switching element,

a unidirectional element, and

a transformer having a primary and a secondary winding; and

a second circuit coupled to the secondary winding for supplying current to the discharge lamp;

wherein the secondary winding, the input terminals, and the second circuit are coupled together such that the second circuit is supplied by a voltage whose amplitude is equal to the sum of the first DC voltage and the second DC voltage in order to transfer some power from the voltage source directly to the secondary circuit without passing through the transformer,

thereby avoiding power loss that would result if the power directly transferred from the voltage source to the secondary circuit were instead transferred to the secondary circuit through the transformer.

2. The circuit arrangement as claimed in Claim 1, wherein the lamp is a high-pressure discharge lamp.

4. The circuit arrangement as claimed in Claim 1, wherein the first circuit comprises a DC-DC converter of the flyback type.

5. The circuit arrangement as claimed in Claim 2, wherein the first circuit comprises a DC-DC converter of the flyback type.

6. The circuit arrangement as claimed in Claim 4, wherein the first circuit comprises a DC-DC converter of the flyback type.

7. A circuit arrangement as claimed in Claim 1, wherein the input terminal connected to the cathode of the voltage source during lamp operation is also directly connected to an end of the secondary winding.